Research Quarterly for Exercise and Sport2025, Ahead-of-print, 1-9
https://doi.org/10.1080/02701367.2025.2465702

Sports Team Participation, Bias-Based Bullying, and Mental Health Among Transgender and Gender Diverse Adolescents

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Abstract

Purpose: We investigated associations between sport participation and depressive and anxiety symptoms among transgender and gender diverse (TGD) adolescents, considering social positions and experiences of bias-based bullying specific to sexual orientation, gender identity, and/or gender expression (SOGIE-BB). **Method:** TGD adolescents ($n = 10,454$) completed a school survey.

Adolescents in eighth, ninth, or 11th grade self-reported sports team participation, elevated depressive and anxiety symptoms, experiencing past-month SOGIE-BB, specific gender identity, race/ethnicity, and access to resources. We identified groups with highest prevalences of elevated depressive and anxiety symptoms by sports team participation (any/none), experiences of SOGIE-BB (any/none), and social positions using Exhaustive Chi-square Automatic Interaction Detections. Via post-hoc tests, we determined whether prevalences differed between adolescents with the same social positions 1) without SOGIE-BB, 2) with sports participation, and 3) without SOGIE-BB and with sports participation. **Results:** Experiencing SOGIE-BB comprised each of the highest prevalence elevated depressive and anxiety groups. Four of 7 groups with elevated depressive symptoms and 3 of 4 groups with elevated anxiety symptoms reported no sports participation. Among adolescents sharing social positions, experiencing no SOGIE-BB was significantly associated with lower prevalences of elevated depressive and anxiety symptoms. Sports participation was also significantly associated with lower prevalences of elevated depressive and anxiety symptoms, including when experiencing SOGIE-BB. This was true for all but two high prevalence groups. **Conclusion:** Sports team participation is associated with better mental health among TGD adolescents. Experiencing SOGIE-BB is associated with higher mental health risks. Promoting sports participation and preventing SOGIE-BB could each enhance TGD adolescents' well-being.

Article History
Received 17 October 2024
Accepted 6 February 2025

Keywords
Anxiety, depression, intersectionality, LGBTQ+

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Researchers continue to generate more and better insight regarding sport, physical activity, and health among transgender and gender diverse (TGD) young people. Most studies in the United

States, particularly those with large samples of TGD youth, reveal sizable gaps in sport and physical activity participation between TGD adolescents and their cisgender peers (Austin et al., 2024; Clark & Kosciw, 2022; Espinoza et al., 2023; Nagata et al., 2024). Furthermore, variability in team sport participation rates of people with specific TGD identities (e.g., nonbinary, questioning, trans feminine, trans masculine) is notable (Austin et al., 2024; Clark & Kosciw, 2022; Espinoza et al., 2023). However, national and multi-state estimates of organized team sport participation among TGD youth can be difficult to obtain and interpret. While surveillance surveys of young people's health-related behavior provide some relevant data, contemporary estimates are complicated by: states choosing not to disseminate surveillance surveys; failing to include items specific to gender identity on extant surveys; and using inconsistent items when asking about organized sport, physical activity lessons, general physical activity, and gender identity (where included) (Grant Makers in Health, 2024; U.S. Department of Health and Human Services, 2019). Additionally, areas of quantitative research remain nascent. Connections between TGD youths' organized sport involvement and mental health are underexplored, and most sport research does not consider aspects of TGD youths' experiences and identities beyond their gender.

Generally, sport participation can provide social and mental health benefits to young people (Babiss & Gangwisch, 2009). In a recent meta-analysis of 29 studies, Panza et al. (2020) identified small but significant reductions in depressive and anxiety symptoms among adolescents who participated in any organized sports compared to adolescents who did not participate. Longitudinal research points to encouraging findings, with sports team participation in adolescence contributing to better mental health in young adulthood (Doré et al., 2018; Easterlin et al., 2019; Taliaferro et al., 2011). Involvement in team sports, compared to individual physical activities, may be particularly beneficial for young people's mental health, as team sports facilitate more social connectedness

(Doré et al., 2018).

While research demonstrates positive relationships between team sport participation and better mental health outcomes among young people, this remains underexplored among TGD adolescents (Hale et al., 2021). With TGD youth bearing disproportionate mental health burdens (Eisenberg et al., 2017), identifying activities and environments that protect and promote their wellbeing is crucial. While a few studies show associations between sport participation and reduced mental health risks among TGD adolescents involved in team sports, these results come from studies with young people within the broader LGBTQ+ umbrella, rather than TGD adolescents specifically (2022; LaRocca et al., 2023). Clark and Kosciw (Clark & Kosciw, 2022) found that trans and nonbinary students who participated in school sports had higher self-esteem and sense of school belonging—along with lower depression risk—than TGD students who played no sports. Similarly, LaRocca et al. (2023) found lower depression risk and reduced risk of suicidal ideation for TGD youth who played team sports compared to those who did not play. These results suggest sport could offer protective effects specifically for TGD youths' mental health, as it does for adolescents in general.

However, research on TGD young people's experiences in sport has also documented negative experiences they encounter in sport contexts, as well as strong barriers to joining team sports in the first place (Austin et al., 2024). Unwelcoming and actively hostile sport spaces (e.g., binary gendered sports teams and locker rooms), as well as policies requiring youth to play on teams with their assigned sex, dissuade youth from participating (DeChants et al., 2022). Furthermore, bias-based bullying (BBB) within sport and physical education contexts has been associated with worse mental health for TGD and more generally LGBTQ+ young people (Symons et al., 2014). Recently, Kirklewski et al. (2023) examined whether general physical activity moderated the adverse effects of experiencing BBB at school on mental health for adolescents with diverse gender or

sexual identities. While they did find that higher physical activity was associated with better mental health, these associations were essentially nullified when they included BBB as a moderator. For adolescents with diverse gender or sexual identities who experienced any BBB, higher physical activity was not meaningfully associated with better mental health.

Building on their study, additional work should examine whether participating in team sport specifically—a more dynamic social context compared to general physical activity—mitigates or exacerbates the consequences of BBB on mental health for TGD youth. While sport can promote social connection, self-esteem, and mental health, it can also be a context where stigmatization occurs (Dutta et al., 2021; Storr et al., 2020). In addition, scholars have called for the use of intersectional approaches in sport research with gender diverse people (Lee et al., 2023; Storr et al., 2020). Intersectional approaches consider how oppressive systems create social hierarchies that can systematically advantage or disadvantage groups based on multiple social positions or the positions of groups in which they are members relative to power (Berard, 2014; Crenshaw, 1989; Herrick & Duncan, 2018; Lee et al., 2023). TGD young people have different access to and experiences in sport based on interconnections of their gender with other social positions (Farkas, 2022), such as racial and ethnic identity and socioeconomic status (Dutta et al., 2021; Gower et al., 2023; Kaja et al., 2024; Lee et al., 2023). Lee et al. (2023) recently described the importance of leveraging large surveys and using quantitative techniques that simultaneously consider social experiences (like BBB) and multiple social positions (rather than just binary gender and racial and ethnic identity). These techniques could help researchers and policy-makers better understand and address disparities in sport, physical activity, and health, including whether and how such disparities are exacerbated for populations facing multiple forms of social disadvantage (Gower et al., 2023).

Our purpose in the present study was to explore associations

between team sport participation and elevated depressive and anxiety symptoms among TGD adolescents using an intersectional lens. We also considered TGD adolescents' experiences of BBB and social positions of specific gender identity, racial and ethnic identity, socioeconomic status, and grade. That is, we endeavored to examine how associations between sport participation, BBB, and mental health varied at the intersections of these four social positions. To better understand differences in mental health based on experiences of BBB and sport, we also explored whether prevalences of mental health concerns differed among students with the same social positions but different combinations of BBB and sport participation. As this was the first study to simultaneously consider BBB, team sport participation, and multiple social positions among TGD adolescents, we did not make formal *a priori* hypotheses on how elevated depressive and anxiety symptoms would vary at the intersections of these variables.

Methods

Participants and procedures

Data came from the 2022 Minnesota Student Survey (MSS; N = 135,447). The MSS is a cross-sectional survey monitoring students' health and related behaviors, and all Minnesota public and charter schools are invited to participate in the survey triennially. Seventy percent of school districts in the state elected to participate in 2021–2022 academic year for at least one grade. Though the MSS is distributed to fifth, eighth, ninth, and 11th-grade students, fifth-grade students are not asked questions about gender identity. We excluded them from our analyses since we restricted our sample to students who reported a TGD identity (n = 10,545). The University of Minnesota's Institutional Review Board did not consider this study human subjects research due to it being secondary analysis of de-identified data. Therefore, no ethical/IRB approval was required.

Measures

Elevated depressive symptoms

The Patient Health Questionnaire for Anxiety and Depression (PHQ-4) assessed adolescents' depressive symptoms on the MSS (Kroenke et al., 2009). The PHQ-4 is a brief, validated instrument and uses two items to screen for depressive symptoms, asking, "How often in the past 2 weeks have you been bothered by little interest or pleasure in doing things?" and "How often in the past 2 weeks have you been bothered by feeling down, depressed, or hopeless?" Response options for each item include 0 (not at all), 1 (several days), 2 (more than half the days), and 3 (nearly every day). Following Kroenke et al. (2009) recommendation, we summed scores across items and used a score of 3 or higher to indicate a cut point of elevated depressive symptoms that warrants further evaluation. The correlation between these two items in our sample was .60.

Elevated anxiety symptoms

The PHQ-4 also assessed adolescents' symptoms of anxiety (Kroenke et al., 2009). The PHQ-4 uses two items to screen for anxiety symptoms, asking "How often in past 2 weeks have you been bothered by feeling nervous, anxious, or on edge?" and "How often in the past 2 weeks have you been bothered by not being able to stop or control worrying?" Response options for each item include 0 (not at all), 1 (several days), 2 (more than half the days), and 3 (nearly every day). Like with depressive symptoms and following Kroenke et al. (2009) recommendation, we summed items and used a score of 3 or higher across both items as a cut point of elevated anxiety symptoms indicating a need for further evaluation. The correlation between these two items in our sample was 77.

Sports team participation

One MSS item assessed adolescents' involvement with a sports team. It asked, "During a typical week, how often do you participate in the following activities outside of the regular school day? Sports teams, such as park and rec teams, school teams, in-house teams or traveling." Responses were on a 5-point scale (i.e., 0 days, 1 day, 2 days, 3–4 days, or 5 or more days). Most TGD adolescents did not participate on sports teams, and most who did participate on any sports teams did so on more days of the week rather than fewer. Thus, we created a dichotomous sports team participation indicator (any sports team participation versus none).

Sexual orientation, gender identity, and/or gender expression-based bullying (SOGIE-BB)

We used three items from the MSS to create our BBB variable. Each was prefaced with, "During the last 30 days, how often have other students harassed or bullied you for any of the following reasons?" This question stem was followed by: "Your sex or gender (being male, female, transgender, genderqueer, or genderfluid);" "Your gender expression (your style, dress, or the way you walk or talk);" and "Because you are bisexual, gay, lesbian, asexual, pansexual, queer, or because someone thought you were." Response options for the three items included "Never;" "Once or twice;" "About once a week;" "Several times a week;" and "Every day." Collectively, these items captured bullying based on sexual orientation, gender identity, and gender expression (i.e., SOGIE-BB), combining the multiple types of bullying that adolescents with marginalized gender identities and sexual orientations may experience (as we have done previously) (Kaja et al., 2024). We created a combined dichotomous variable with "none" indicating adolescents had not experienced any of the three types of SOGIE-BB in the past 30 days and "any" indicating adolescents had

experienced one or more of the three types of SOGIE-BB at all in the past 30 days. This "any" versus "none" cut point was based on prior research showing that even infrequent bullying has adverse associations with adolescents' well-being (Gower & Borowsky, 2013; Lawrence et al., 2023).

Gender identity

One MSS item assessed gender identity, and adolescents could select all that applied. The question asked, "What is your gender identity?" Response options included "Agender;" "Boy/man (cisgender, which means your gender identity matches your sex assigned at birth);" "Boy/man (transgender, which means your gender identity does not match your sex assigned at birth);" "Genderfluid;" "Girl/woman (cisgender, which means your gender identity matches your sex assigned at birth);" "Girl/woman (transgender, which means your gender identity does not match your sex assigned at birth);" "Nonbinary;" "Two spirit;" "Questioning/unsure;" and "Identity not listed." For this "select all that apply" variable, we followed previous recommendations (Brown et al., 2024) to categorize students into one of the nine categories: Two-Spirit, transgender boy, transgender girl, agender, nonbinary or genderfluid, questioning gender identity, an identity not listed on the survey, cisgender girl, and cisgender boy. For the purposes of the present analysis, we selected students who were coded in any category except cisgender girl or cisgender boy for inclusion in the analytic sample ($N = 10{,}545$).

Racial and ethnic identity

We used one item from the MSS to indicate racial and ethnic identity. The question asked, "How do you describe yourself? Mark all that apply." Response options included "American Indian or Alaska Native;" "Asian, South Asian, or Asian American;" "Black,

African, or African American;" "Hispanic or Latino/Latina;" "Middle Eastern or North African;" "Native Hawaiian or Other Pacific Islander;" and "White." Responses were re-coded by the MSS team such that students selecting a single response were coded as that identity, and those selecting more than one response were combined into a "Multiracial" group.

Access to resources

Based on the National Center for Education Statistics recommendation (Cowan et al., 2012) to use composite variables to represent socioeconomic status whenever possible, we created a three-level indicator of adolescents' access to resources, including technology, housing, and food. This indicator included adolescents' responses to an index with items about access to six different resources in the home (e.g., access to the internet, a computer, ≥ 26 books); responses to an item asking about experiences of food insecurity (i.e., "During the last 30 days, have you had to skip meals because your family did not have enough money to buy food?"); and responses to an item asking about housing insecurity (i.e., "During the past 12 months, have you stayed in a shelter, somewhere not intended as a place to live, or someone else's home because you had no other place to stay?"). We categorized adolescents who reported having all six resources in the home and no food or housing insecurity as having the highest access to resources. We categorized adolescents who reported fewer than six resources but no food or housing insecurity as having moderate access to resources. We categorized all adolescents who had experienced any food or housing insecurity, regardless of the number of resources they reported having access to, as having low access to resources (as done previously) (Kaja et al., 2024). The items used for this indicator were new to the MSS in 2022. School-level averages for this student-reported access to resource variables correlated strongly with the school-reported percentage of students receiving free or

reduced-price lunch (a federal program in the United States).

Grade

Because of its potential associations with mental health concerns and sport participation (Eime et al., 2016; Solmi et al., 2022), we included adolescents' grade (eighth, ninth, or 11th) in our analyses.

Statistical analysis

We conducted descriptive analyses for all study variables and then examined bivariate associations between study variables and depressive and anxiety symptoms. Then, we used exhaustive Chi-square automatic interaction detection (ECHAID) to examine how specific gender identity, racial and ethnic identity, access to resources, grades, exposure to SOGIE-BB, and sports team participation related to elevated depressive and anxiety symptoms. ECHAID, a decision-tree approach useful for analyzing large datasets in studies with a focus on intersectionality, considers all predictors to determine the one with the smallest p-value. Next, it creates empirically similar groups ("nodes") of responses on that variable. Then, the decision tree expands, with each node splitting by the predictor with the smallest p-value until there remain no significant predictors or specific rules have been reached (i.e., smallest node size of 40, tree depth of 5). ECHAID includes all missing data on predictors as specific response categories and uses a Bonferroni correction (Bauer et al., 2021; Kass, 1980). Output includes index values that indicate how the node prevalence compares to the overall sample prevalence on the dependent variable. Index values greater than 100% indicate that the node has a higher prevalence of the dependent variable than the overall sample. For analyses, we present the highest prevalence nodes from each tree (i.e., elevated depressive symptoms and elevated anxiety symptoms) with index values above 125% (i.e., 25% greater prevalence of elevated

depressive or anxiety symptoms than the sample mean). We also conducted post-hoc Chi-square tests examining the prevalence of elevated depressive or anxiety symptoms for three groups of youth with the same social positions as those in our highest prevalence nodes: 1) youth who did not report BBB, 2) youth who participated in sport, and 3) youth who did not report BBB *and* did participate in sport.

Results

Sample descriptive statistics are included in Table 1. More than a third of the TGD sample identified as nonbinary or genderfluid, with another quarter questioning their gender identity. In terms of racial and ethnic identity, 63.9% of TGD students identified as White, with 14.0% indicating more than one racial or ethnic identity. Overall, 29.8% participated in team sports. About 58% reported being bullied or harassed in the past 30 days for their sexual orientation, gender identity, or gender expression. The overall prevalences of elevated depressive symptoms and elevated anxiety symptoms were 54.3% and 59.8%, respectively.**Table 1**. Sample description ($N = 10,545$). (Table view)

Variable Name	n (%) of Sample	% with Elevated Depressive Symptoms	% with Elevated Anxiety Symptoms
TOTAL	10,545 (100)	54.3%	59.8%
Gender Identity			
Agender	1,175 (11.1)	41.0%	41.6%
Another gender not listed	1,487 (14.1)	37.3%	39.0%
Nonbinary or genderfluid	3,750 (35.6)	61.5%	69.4%
Questioning gender identity	2,834 (26.9)	56.1%	62.6%
Trans boy	896 (8.5)	61.5%	64.2%
Trans girl	308 (2.9)	43.3%	51.6%
Two-Spirit[a]	95 (0.9)	60.9%	68.1%

Missing	0 (0.0)		
Racial and Ethnic Identity			
American Indian or Alaska Native	194 (1.9)	56.8%	54.4%
Asian	621 (6.0)	49.7%	50.5%
Black, African, or African American	684 (6.6)	46.1%	48.2%
Hispanic or Latina/o	719 (6.9)	51.9%	55.8%
Middle Eastern or North African	45 (0.4)	63.6%	60.6%
Native Hawaiian or Other Pacific Islander	34 (0.3)	50.0%	55.0%
White	6,671 (63.9)	54.4%	61.1%
Multiracial	1,484 (14.0)	59.6%	65.0%
Missing	113 (1.1)		
Grade			
8th	4,179 (39.6)	53.2%	59.4%
9th	3,773 (35.8)	56.1%	60.6%
11th	2,593 (24.6)	53.6%	59.6%
Access to Resources			
Low	1,071 (11.9)	67.4%	70.4%
Moderate	4,664 (52.0)	53.7%	57.4%
High	3,234 (36.1)	50.9%	60.1%
Missing	1,576 (14.9)		
Any Sport Participation			
None	6,920 (70.2)	58.4%	63.7%
Any	2,941 (29.8)	44.5%	50.5%
Missing	684 (6.5)		
Any SOGIE-BB			
None	4,227 (42.1)	40.5%	44.0%
Any	5,810 (57.9)	64.3%	71.2%

Missing	508 (4.8)	

Note. For non-missing response options, valid percent is reported. [a]Only adolescents who reported American Indian or Alaska Native for Racial and Ethnic Identity are included in Two-Spirit gender identity. SOGIE-BB = sexual orientation-, gender identity-, and/or gender expression-based bullying.

Groups with elevated depressive symptoms are shown in Table 2. For example, among youth who identified as nonbinary or genderfluid, had low access to resources, and experienced SOGIE-BB, 81.0% had elevated depressive symptoms compared to 54.3% in the full sample of TGD youth (index = 149.1%). Of note, SOGIE-BB was present in all the highest prevalence nodes. No sports team participation was evident in four of the highest prevalence nodes, particularly for questioning, Two-Spirit, agender, trans boy, and nonbinary or genderfluid adolescents, most often with low or moderate access to resources (versus high). In the other three highest prevalence elevated depressive symptom nodes, no significant differences by sports team participation emerged. Post-hoc tests revealed that adolescents with the same combinations of social positions but no past 30 day exposure to SOGIE-BB had an average of 24.9% lower prevalence of elevated depressive symptoms (range: 19.1% to 30.2%). For example, among nonbinary or genderfluid youth with low access to resources and who reported no SOGIE-BB, 59.0% reported elevated depressive symptoms—22.0% lower than the 81.0% among youth with the same identities and SOGIE-BB. Adolescents with the same social positions but who reported sports team participation had an average of 19.0% lower prevalence of elevated depressive symptoms (10.9% to 28.8%). When comparing adolescents with the same social positions as the original nodes but with sports team participation and no SOGIE-BB, rates of elevated depressive symptoms were 38.9% lower on average (19.0% to 49.8%). Unless indicated with “NS” in Tables 2 or 3, these comparison prevalences were significantly lower than the original high prevalence nodes.**Table 2**. Highest prevalence nodes from

ECHAID for elevated depressive symptoms among Transgender and Gender diverse youth ($N = 9{,}055$; overall prevalence = 54.3%). (Table view)

Index	Gender Identity	Access to Resources	Grade	Sport Participation	SOGIE-BB	Prevalence with Elevated Depressive Symptoms (n)	Prevalence if SOGIE-BB = No	Prevalence if Sport = Yes	Prevalence if SOGIE-BB=No and Sport = Yes
149.1%	Nonbinary or GF	Low	—	—	Yes	81.0% (284)	59.0%		
144.4%	Questioning	Moderate	11th	No*	Yes	78.4% (116)	52.9%	73.9%	NS 28.6%
141.6%	Questioning	Low*	—	No*	Yes	76.9% (156)	57.8%	59.5%	57.9%
133.7%	Two-Spirit, Agender	—	9th, 11th	No	Yes	72.6% (168)	42.4%	43.8%	23.0%
131.3%	Trans boy, Nonbinary or GF	Moderate	—	No*	Yes	71.3% (1,101)	49.9%	60.4%	34.3%
121.2%	Trans girl, Identity not listed	Low*	—	—	Yes	68.5% (108)	41.7%		
125.4%	Trans boy	Low	—	—	Yes	68.1% (69)	39.1%		

Note. — indicates nodes did not split by a particular social position; thus, that node implicitly includes all participants for that social position (e.g., all access to resources groups; all grades). * indicates node also contains missing responses on specific variable. Index refers to index score, which is the prevalence of elevated depressive symptoms in a terminal node divided by prevalence of elevated depression in the analytic sample multiplied by 100. GF = genderfluid. SOGIE-BB = sexual orientation-, gender identity-, and/or gender expression-based bullying. Race and ethnicity are not shown: no significant differences emerged by race and ethnicity. All

prevalence estimates (e.g., Prevalence if SOGIE-BB = No) are for elevated depressive symptoms. [NS] indicates that the Chi-square post-hoc comparison for Prevalence (of Elevated Depression) if Sport = Yes did not significantly differ from Prevalence with Elevated Anxiety Symptoms (overall).

Table 3. Highest prevalence nodes from ECHAID for elevated anxiety symptoms among Transgender and Gender diverse youth (N = 9,038; overall prevalence = 59.8%). (Table view)

Index	Race/Ethnicity	Gender Identity	Access to Resources	Grade	Sport Participation	SOGIE-BB	Prevalence with Elevated Anxiety Symptoms (n)	Prevalence if SOGIE-BB = No	Prevalence if Sport = Yes	Prevalence if SOGIE-BB = No and Sport = Yes
139.0%	Asian, White, Latina/o/x, NHPI, Multiracial*	Trans boy, Nonbinary or GF, Questioning*	Low	—	Yes	Yes	83.2 (101)	65.6%		
135.8%	—	Two-Spirit, Agender, Trans girl	—	11th	No*	Yes	81.3 (96)	39.6%	45.0%	60.0%
135.6%	—	Agender, Trans girl	Low	—	No*	Yes	81.1 (403)	60.7%	75.9%	NS 63.9%
126.4%	AIAN, NHPI, White, Multiracial*	Two-Spirit, Trans boy, Nonbinary or GF, Questioning*	Moderate, High*	—	No*	Yes	75.7 (2,446)	55.1%	69.6%	44.8%

Note. — indicates nodes did not split by a particular social

position; thus, that node implicitly includes all participants for that social position (e.g., all access to resources groups; all grades). * indicates node also contains missing responses on specific variable. Index refers to index score, which is the prevalence of elevated depressive symptoms in a terminal node divided by prevalence of elevated depression in the analytic sample multiplied by 100. GF = genderfluid. SOGIE-BB = sexual orientation-, gender identity-, and/or gender expression-based bullying. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. All prevalence estimates (e.g., Prevalence if SOGIE-BB=No) are for elevated anxiety symptoms. ^{NS} indicates that the Chi-square post-hoc comparison for Prevalence (of Elevated Depression) if Sport=Yes did not significantly differ from Prevalence with Elevated Anxiety Symptoms (overall).

For elevated anxiety symptoms (Table 3), SOGIE-BB was also reported by adolescents in all of the highest prevalence nodes. Adolescents in three of the four highest prevalence anxiety nodes reported no or missing sports team participation. Adolescents who self-reported as trans boys, nonbinary or genderfluid, or questioning made up three of the four highest prevalence nodes, including those with low, moderate, or high access to resources and most racial and ethnic identities. Post-hoc tests indicated that adolescents with the same social positions but who were not exposed to BBB had 25.1% lower prevalence of elevated anxiety symptoms on average (17.6% to 41.7%) compared to adolescents who did report SOGIE-BB. Adolescents with the same social positions but who reported sports team participation had 21.2% lower prevalence of elevated anxiety symptoms on average (6.1% to 36.3%). For the three groups of adolescents who did not report sport participation, rates of elevated anxiety symptoms were 23.1% lower on average (17.2% to 30.9%) among adolescents who participated on a sports team and did not report SOGIE-BB compared to the original nodes.

Discussion

Our study of associations between sports team participation,

BBB, and mental health among TGD adolescents is one of few to consider these constructs simultaneously with adolescents' intersectional identities. Overall, we found that TGD adolescents who participated on a sports team had a lower prevalence of elevated depressive and anxiety symptoms than similar adolescents who did not participate. Using an intersectional approach that included experiences of BBB and multiple social positions, we found that participating on a sports team was associated with lower mental health risks for TGD adolescents with different gender identities and who encountered multiple forms of social disadvantage. This marks a new contribution to the literature, as previous studies of TGD adolescents' sport participation and mental health (Herrick & Duncan, 2018; LaRocca et al., 2023) have not included BBB or intersecting marginalized identities. Also importantly, the lowest rates of mental health concerns existed among TGD adolescents who participated on a sports team and did not experience any BBB. Finally, some patterns differed between depression and anxiety symptoms and point to new directions for research and intervention.

Our results mirror other studies showing that BBB toward TGD adolescents is associated with elevated mental health concerns, particularly among TGD adolescents with multiple marginalized social positions (Eisenberg et al., 2024; Gower & Borowsky, 2013; Gower et al., 2023). Critically, BBB was present in each of our highest prevalence groups for elevated depressive and anxiety symptoms. Studies exploring the contributions of sport to mental health among TGD adolescents without accounting for experiences of BBB (or multiple social positions) may mis- and overestimate the effects of sport (Symons et al., 2014). Regarding the context of BBB, our items asked about SOGIE-BB from other students, meaning it could have taken place at school, in school sports settings, and elsewhere. More can be done to prevent and address bias and bullying for TGD youth across academic and extracurricular environments, as student-reported SOGIE-BB and other forms of BBB

(e.g., based on race or religion) remain highly prevalent (Gower et al., 2023). Just as many schools have implemented bias-awareness and anti-bullying approaches, sport organizations should similarly implement strategies to protect adolescents from BBB of all types. Sport-specific anti-bullying resources are available for free or low cost, such as #REFORMTheLockerRoom (a resource from athletic apparel company PUMA and The Trevor Project) (The Trevor Project, 2024) and the U.S. Center for SafeSport's "Preventing Bullying: What Great Coaches Need to Know" (U.S. Center for Safe Sport, n.d.).

Next, we add new contributions to research on elevated depressive symptoms and sports team participation for TGD adolescents. Our pattern of results indicates that sports team participation is related to lower depressive symptoms among TGD adolescents, both when they do and do not experience BBB. Interestingly, it contrasts findings from Kirklewski et al. (2023), who concluded that self-reported physical activity was not significantly associated with better mental health among sexual- and gender-minoritized adolescents who experienced BBB. Several differences could explain our novel findings. First, we considered TGD adolescents only, whereas Kirklewski and colleagues' analyses included cisgender adolescents (with diverse sexual orientations) and fewer gender diverse adolescents. Kirklewski and colleagues also used a more limited measure for participants to self-report gender identity, which did not include agender, questioning, or Two-Spirit (i.e., identities comprising some of our high prevalence groups). Also, their study involved a convenient sample of adolescents recruited through social media, whereas as our data were gathered via a census design with students in schools. Finally, sports team participation involves different mechanisms that may alleviate depressive symptoms compared to general physical activity (Doré et al., 2018; Eather et al., 2023; Eime et al., 2013). Team sports can offer: regular social interaction; opportunities to build positive relationships with teammates and coaches; support for self-

esteem; and chances to find a sense of belonging (Eather et al., 2023; Eime et al., 2013; Sheridan et al., 2014). Physical activity may be done alone and without the same social and environmental enrichments as sports (Doré et al., 2018; Eather et al., 2023; Eime et al., 2013).

Our findings regarding anxiety differed from those regarding depression. While we observed a higher prevalence of elevated anxiety symptoms among TGD adolescents who did not participate on a sports team, our highest prevalence anxiety node did include adolescents who participated. Yet, these trans boys, nonbinary or genderfluid, and questioning adolescents who participated on a sports team also experienced low access to resources. It is critical to remember that our low access to resources group represented adolescents who had experienced recent housing or food insecurity (or potentially both). The stressors of housing and food insecurity, and additional stressors that accompany them, are known to elevate adolescents' symptoms of anxiety (McLaughlin et al., 2012; Pierce et al., 2024). The effects of housing or food insecurity on anxiety symptoms, in tandem with experiencing BBB, likely persist whether adolescents play a sport or not. It could also be that the factors that cause sport to be related to lower depressive symptoms (i.e., social connection) do less to alleviate anxiety (Babiss & Gangwisch, 2009; Panza et al., 2020). Finally, sports contexts might contribute to anxiety for TGD adolescents with multiple marginalized identities, or TGD adolescents with multiple marginalized identities may be navigating stressful conditions to be able to participate.[19,20] For example, trans boys and trans men encounter barriers to feeling safe and accepted in sport spaces, though loud social and political conversations have often centered on trans girls and trans women (Barras, 2024). These same trans boys and trans men could be navigating difficult financial barriers to be able to participate or feeling discriminated against based on the socioeconomic status (Dutta et al., 2021). It could also be that adolescents with gender identities outside the binary or different from assigned sex could

encounter anxiety-provoking challenges in existing sport systems. More intersectional research is needed on relationships between sport experiences and mental health among these youth (Sone et al., 2024). Such research should incorporate the effects of low access to resources and experiences of BBB.

Limitations and strengths

Several limitations accompany the study findings. Our data were cross-sectional and self-reported, so assessments of key variables occurred simultaneously. For example, we could not deduce causal relationships between sports team participation and depressive symptoms. Observed associations between no sports team participation and elevated depressive symptoms could stem from the fact that when adolescents are already depressed, it is harder for them to participate in extracurricular activities. Our SOGIE-BB items did not capture where BBB had occurred. The nature of the data prevented us from examining whether sports team participation could buffer against the effects of BBB on mental health if the BBB was experienced at school, but no BBB happened on the sports team, for example. This could be an opportunity for future research. Another potential limitation is that some intersecting groups were small and may have had limited power to split out from others in the ECHAID, even where there were differences (e.g., Black, African, or African American adolescents who were trans boys, nonbinary or genderfluid, or questioning their gender, had low access to resources, and who participated in sports). Comparison groups derived from these intersecting groups (i.e., with no BBB) would be even smaller. While missingness on any independent variable was treated as its own category in ECHAIDs and missingness on independent variables was low, TGD adolescents who did not respond to items for depressive and anxiety symptoms (~14%) were dropped from ECHAIDs. A final limitation is that we used a dichotomous team sport participation variable. Future analyses with

a variable indicating amount of sports team participation could facilitate analyses of whether there is a dose–response effect between sport participation and mental health outcomes. Specific sports types may also matter. Study strengths include: a large sample of TGD adolescents; use of a select-all-that-apply item distinguishing seven different gender identities; use of a validated screener for elevated depressive symptoms and anxiety symptoms; and an appropriate statistical technique for considering intersectional identities (Bauer et al., 2021).

Conclusion

TGD adolescents with multiple marginalized identities and who experience BBB have high prevalences of elevated depressive and anxiety symptoms. Sports team participation is associated with these mental health concerns. We recommend researchers incorporate experiences of BBB and consider intersectional identities in future analyses. We also recommend practitioners (such as teachers, coaches, athletic directors, and others) continue working to prevent bullying, promote sports team participation, and support mental health for TGD youth. Preventing BBB could be one way to support TGD adolescents' mental health. Promoting their participation on sports teams could be another. Our study emphasizes the need for schools, sports organizations, and decision-makers to think critically about policies related to gender and sex, given the potential mental health benefits of team sports for TGD youth.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the National Institutes of Health's National Center for Advancing Translational Sciences under Grant [1UM1TR004405-01A1], the National Institutes of Health's National Institute on Minority Health and Health Disparities under Grant [5R01MD015722-04], and the Williams Institute and Women's Sports Foundation Trans Inclusion in Sports Seed Grant Program. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders.

Data availability statement

The data that support the findings of this study are available from the Minnesota Department of Education. Restrictions are applied to the availability of these data, which were approved for use in this study. Data requests can be made at https://education.mn.gov/mde/dse/health/mss/

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Sections

Guide

Table 1. Sample description (*N* = 10,545).

Variable Name	n (%) of Sample	% with Elevated Depressive Symptoms	% with Elevated Anxiety Symptoms
TOTAL	10,545 (100)	54.3%	59.8%
Gender Identity			
Agender	1,175 (11.1)	41.0%	41.6%
Another gender not listed	1,487 (14.1)	37.3%	39.0%
Nonbinary or genderfluid	3,750 (35.6)	61.5%	69.4%
Questioning gender identity	2,834 (26.9)	56.1%	62.6%
Trans boy	896 (8.5)	61.5%	64.2%
Trans girl	308 (2.9)	43.3%	51.6%
Two-Spirit[a]	95 (0.9)	60.9%	68.1%
Missing	0 (0.0)		
Racial and Ethnic Identity			
American Indian or Alaska Native	194 (1.9)	56.8%	54.4%
Asian	621 (6.0)	49.7%	50.5%
Black, African, or African American	684 (6.6)	46.1%	48.2%
Hispanic or Latina/o	719 (6.9)	51.9%	55.8%
Middle Eastern or North African	45 (0.4)	63.6%	60.6%
Native Hawaiian or Other Pacific Islander	34 (0.3)	50.0%	55.0%
White	6,671 (63.9)	54.4%	61.1%
Multiracial	1,484 (14.0)	59.6%	65.0%
Missing	113 (1.1)		
Grade			
8th	4,179 (39.6)	53.2%	59.4%

9th	3,773 (35.8)	56.1%	60.6%
11th	2,593 (24.6)	53.6%	59.6%
Access to Resources			
Low	1,071 (11.9)	67.4%	70.4%
Moderate	4,664 (52.0)	53.7%	57.4%
High	3,234 (36.1)	50.9%	60.1%
Missing	1,576 (14.9)		
Any Sport Participation			
None	6,920 (70.2)	58.4%	63.7%
Any	2,941 (29.8)	44.5%	50.5%
Missing	684 (6.5)		
Any SOGIE-BB			
None	4,227 (42.1)	40.5%	44.0%
Any	5,810 (57.9)	64.3%	71.2%
Missing	508 (4.8)		

Note. For non-missing response options, valid percent is reported. [a]Only adolescents who reported American Indian or Alaska Native for Racial and Ethnic Identity are included in Two-Spirit gender identity. SOGIE-BB = sexual orientation-, gender identity-, and/or gender expression-based bullying.

Table 2. Highest prevalence nodes from ECHAID for elevated depressive symptoms among Transgender and Gender diverse youth ($N = 9{,}055$; overall prevalence = 54.3%).

Index	Gender Identity	Access to Resources	Grade	Sport Participation	SOGIE-BB	Prevalence with Elevated Depressive Symptoms (n)	Prevalence if SOGIE-BB = No	Prevalence if Sport = Yes	Prevalence if SOGIE-BB=No and Sport = Yes
149.1%	Nonbinary or GF	Low	—	—	Yes	81.0% (284)	59.0%		
144.4%	Questioning	Moderate	11th	No*	Yes	78.4% (116)	52.9%	73.9%	NS* 28.6%
141.6%	Questioning	Low*	—	No*	Yes	76.9% (156)	57.8%	59.5%	57.9%
133.7%	Two-Spirit, Agender	—	9th, 11th	No	Yes	72.6% (168)	42.4%	43.8%	23.0%
131.3%	Trans boy, Nonbinary or GF	Moderate	—	No*	Yes	71.3% (1,101)	49.9%	60.4%	34.3%
121.2%	Trans girl, Identity not listed	Low*	—	—	Yes	68.5% (108)	41.7%		
125.4%	Trans boy	Low	—	—	Yes	68.1% (69)	39.1%		

Note. — indicates nodes did not split by a particular social position; thus, that node implicitly includes all participants for that social position (e.g., all access to resources groups; all grades). * indicates node also contains missing responses on specific variable. Index refers to index score, which is the prevalence of elevated depressive symptoms in a terminal node divided by prevalence of elevated depression in the analytic sample multiplied by 100. GF = genderfluid. SOGIE-BB = sexual orientation-, gender identity-, and/or gender expression-based bullying. Race and ethnicity are not

shown: no significant differences emerged by race and ethnicity. All prevalence estimates (e.g., Prevalence if SOGIE-BB = No) are for elevated depressive symptoms. ^{NS}indicates that the Chi-square post-hoc comparison for Prevalence (of Elevated Depression) if Sport = Yes did not significantly differ from Prevalence with Elevated Anxiety Symptoms (overall).

Table 3. Highest prevalence nodes from ECHAID for elevated anxiety symptoms among Transgender and Gender diverse youth ($N = 9{,}038$; overall prevalence = 59.8%).

Index	Race/Ethnicity	Gender Identity	Access to Resources	Grade	Sport Participation	SOGIE-BB	Prevalence with Elevated Anxiety Symptoms (n)	Prevalence if SOGIE-BB = No	Prevalence if Sport = Yes	Prevalence if SOGIE-BB = No and Sport = Yes
139.0%	Asian, White, Latina/o/x, NHPI, Multiracial*	Trans boy, Nonbinary or GF, Questioning*	Low	—	Yes	Yes	83.2 (101)	65.6%		
135.8%	—	Two-Spirit, Agender, Trans girl	—	11th	No*	Yes	81.3 (96)	39.6%	45.0%	60.0%
135.6%	—	Agender, Trans girl	Low	—	No*	Yes	81.1 (403)	60.7%	75.9%	NS 63.9%
126.4%	AIAN, NHPI, White, Multiracial*	Two-Spirit, Trans boy, Nonbinary or GF, Questioning	Moderate, High*	—	No*	Yes	75.7 (2,446)	55.1%	69.6%	44.8%

Note. — indicates nodes did not split by a particular social position; thus, that node implicitly includes all participants for that social position (e.g., all access to resources groups; all grades). * indicates node also contains missing responses on specific variable. Index refers to index score, which is the prevalence of elevated depressive symptoms in a terminal node divided by prevalence of

elevated depression in the analytic sample multiplied by 100. GF = genderfluid. SOGIE-BB = sexual orientation-, gender identity-, and/or gender expression-based bullying. AIAN = American Indian or Alaska Native. NHPI = Native Hawaiian or Other Pacific Islander. All prevalence estimates (e.g., Prevalence if SOGIE-BB=No) are for elevated anxiety symptoms. [NS] indicates that the Chi-square post-hoc comparison for Prevalence (of Elevated Depression) if Sport=Yes did not significantly differ from Prevalence with Elevated Anxiety Symptoms (overall).